NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Calvert Cliffs, Unit 1	0 5 0 0 0 3 1 7	1 OF 0 5

TITLE (4)
Containment Personnel Air Lock Interlock Inoperable

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 6	2 8	8 8	8 8	— 0 1 0	— 0 0	0 9	1 6	8 8		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	4	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
L.S. Larragoite, Licensing Engineer	3 0 1 2 6 0 - 4 9 8 3

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

Calvert Cliffs Unit 1 operated between June 28, 1988, until August 16, 1988, with an inoperable containment air lock outer door interlock. This was discovered during the performance of a Surveillance Test Procedure (STP) on August 16, 1988 at 1830. The outer door's interlock was restored to Operable status by 2110, August 16. Both the outer and inner door's interlocks were defeated as recommended by the vendor, and as allowed by technical specifications during MODE 5 (<200 degrees, 0 percent reactor power) on June 22, 1988. On June 25, 1988, only the inner door's interlock was restored. On June 28, Unit 1 entered MODE 4 (>200 degrees, 0 percent reactor power) during the power ascent to MODE 1 (100 percent reactor power). For the reasons discussed in this LER's text, an unrecognized challenge of the outer door's interlock, by opening both doors simultaneously, is considered unlikely to have occurred during this event.

The cause of the event was due primarily to improper use of the procedure to defeat and restore the air lock door's interlocks, combined with the lack of clarity of the procedure. Corrective actions taken or planned include: (1) Calvert Cliffs Unit 2 air lock interlocks have been verified operable by review of the most recent STP. (2) The STP which verifies the operability of each door's seal, following opening of a containment door, will be modified to also include the testing of both door's interlocks. (3) The procedure to defeat and restore the personnel air lock door's interlocks has been modified. (4) A review of this event will be incorporated into the training on the revised HE-21. Specific training will also be given on the containment air lock operating mechanism.

IE22
1/1

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Calvert Cliffs, Unit 1	0 5 0 0 0 3 1 7	8 8	— 0 1 0	— 0 0	0 2 OF 0 5

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Event Summary

At 1830 on August 16, 1988, while Calvert Cliffs Unit 1 was operating in MODE 1 at 100 percent power, the containment (EIIS NH) personnel air lock (EIIS NH-AL) was determined inoperable during the performance of Surveillance Test Procedure (STP) M-471-1 (Air Lock Door Operability and Local Leak Rate Test).

Two functions are checked by STP M-471-1. First, the overall air lock leakage when pressurized to 50 psig is verified to be within specification. The "as found" air lock leakage was within specification. Second, the interlocks (EIIS NH-IMEC) which prevent simultaneously opening both air lock doors (EIIS NH-DR) are verified to function properly. The outer (relative to containment) air lock door's interlock was found inoperable. The associated 24 hour action statement for the inoperable interlock was entered. The interlock function was restored and the containment air lock was verified Operable by 2110, August 16, 1988.

Description of Containment Personnel Air Lock and Interlock

The containment personnel air lock is a two door air lock used for normal personnel access through the containment structure (see Figure 1). Mounted on each end of the airlock is an 80 inch by 42 inch wide door. Each door swings toward the containment interior and is sealed with a double gasket (EIIS NH-SEAL). Pressure inside the personnel air lock is equalized with outside pressure by means of two ball valves (EIIS NH-V). Each combination of door and associated equalizing valve is operated by a handwheel (EIIS NH-84) (and arrangement of shafts, gears, etc., see Figure 2) which performs the following sequence when turned in the open direction:

1) A limit switch will actuate a Control Room alarm,
2) The equalizing valve for the door will open,
3) The door latch will release, and
4) The door will swing open.

The reverse of the above occurs when the handwheel is turned in the closed direction. An interlock for each door prevents that door from opening if the other door has not gone through the full closed sequence. Each door's interlock is accomplished by a pawl which engages the respective door's operating system and prevents rotation of the gears if the other door is not fully closed.

The interlocks may be defeated during shutdown conditions (<200 degrees Fahrenheit, 0 percent reactor power) when containment integrity is not required and both doors can be opened simultaneously. As recommended by the vendor technical manual, the interlocks are defeated by wedging a block (EIIS NH-BLK) beneath the desired interlock's pawl. This prevents the pawl from engaging the respective door's operating system and allows that door to open if the other door is not closed.

Cause of the Event

Upon troubleshooting on August 16, the outer door's interlock was found defeated with a block inserted below the pawl. The block was removed and the outer door's interlock was tested and verified Operable. At no time during the performance of STP M-471-1, or restoration of the outer door's interlock, were both containment personnel air lock doors opened simultaneously.

STP M-471-1 tests the outer door's interlock by opening the air lock's inner door and verifying the outer door cannot be opened. Determination of the outer door's non-functioning interlock was made by noting the operation of the outer door's equalizing valve which functions prior to the opening of the airlock's outer door. Although the equalizing valve came off its closed seat, (a small path was present between containment and the Auxiliary Building) the valve was immediately shut by the technician. The inner door was then restored to the closed position.

A review of all STPs, maintenance orders, and Control Room log entries associated with the containment air lock was performed. In addition, those personnel associated with the defeating/restoration of the containment air lock door's interlocks were interviewed. On June 22, during MODE 5 conditions (<200 degrees Fahrenheit, 0 percent reactor power), the Unit 1 containment personnel air lock interlocks were defeated for maintenance reasons (Unit 1 was completing a refueling overhaul). The interlocks were defeated using an approved maintenance order and an approved maintenance procedure (HE-21, Containment Personnel Air Lock Interlock Defeat and Re-establish).

At the time of use, HE-21 only provided the vendor's recommended method of defeating the inner door's interlock (inserting a block below the inner door's interlock pawl). This allowed the inner door to be opened with the outer door open. The procedure also provided the method to re-establish the inner door's interlock (remove the block) and verify the operability of both the inner and outer door's interlock. However the procedure was not clear. In the prerequisites, 2 blocks were identified as being necessary. Also, a note following the procedure to defeat the inner door's interlock stated: "Both doors may be operated with this method of defeating the interlock; however, in order to shut both doors, the Containment side door must be shut first." The note's intent was in reference to opening/closing both doors, not defeating both door's interlocks.

The cause of the event was due primarily to improper use of procedure combined with the lack of clarity of the procedure. Contrary to HE-21, the technician defeated both the inner and outer door's interlocks (on June 22) by inserting a block under each door's interlock pawl. (See Figure 1 for the locations of each). On June 25, 1988, a different technician, using HE-21, restored the inner door's interlock (by removing the block beneath the inner door's pawl). The outer door's interlock was not restored since HE-21 addressed only the inner door's interlock.

The technician then tested the door's interlocks. However, he did not test the door's interlocks strictly in accordance with procedure. HE-21 requires cycling each door open and checking that the other door does not operate. Instead, the technician stated he turned one door's handwheel approximately 1 rotation (5.5 rotations are required to fully open the door) and attempted to turn the other door's handwheel. After the handwheel (with one rotation) was rotated fully closed, the process was repeated for the other door's interlock. Testing using this method gave the indication both interlocks functioned (i.e., the handwheel other than the handwheel with one rotation would not turn). It is not clear at this time why this method (although not approved) would give an indication the interlock functioned.

Assessment of the Safety Consequences

From June 28, 1988, when Unit 1 entered MODE 4 (>200 degrees Fahrenheit), until discovery and correction August 16, 1988, Unit 1 operated in a condition prohibited by technical specifications which require both interlocks be operable in MODEs greater or equal to MODE 4. However, the likelihood that the outer door's interlock was challenged during this period is considered extremely small for the following reasons:

1) The nature of an air lock suggests opening only one door at a time to allow equalizing pressure within the inner chamber.

2) The inner door's interlock was Operable and only the outer door's interlock was defeated. Therefore opening both doors simultaneously would require first opening and fully shutting the outer door, then opening the inner door, followed by opening the outer door.

3) Personnel who would have access to containment are aware of the requirement to keep one door closed at all times.

4) A Control Room alarm is actuated on either ball valve's operating mechanism. If either ball valve (which opens before the door) was inadvertently left open, this alarm would have remained in alarm status in the Control Room.

5) If the scenario presented in (2) above was performed inadvertently, with any differential pressure between the containment and the Auxiliary Building, the air lock chamber would never equalize with the pressure outside containment. This would provide a positive indication that the inner door (or equalizing valve) was open and that the interlock was not functioning.

   Also, without the capability to equalize pressure in the air lock, a significant force (approximately 320 lbf per 0.1 psid across the door)

would be applied to the door being opened. If the pressure in containment were positive (relative to the Auxiliary Building) and the airlock had not equalized, opening of either door would be extremely difficult if not impossible. If the pressure were negative, the large air flow through either cracked open door would have provided indication of the malfunction.

A review of Control Room logs showed that between June 28 and August 16, 1988, the pressure within containment consistently trended upward. Numerous (fourteen) ventings were performed during this period to reduce pressure within containment. Therefore, an unrecognized challenge of the outer door's interlock, by opening both doors simultaneously is considered unlikely.

Corrective Actions

The following corrective actions have been taken or are planned:

1) HE-21 has been revised to clearly require defeating both door's interlocks and reestablishing both door's interlocks. This change was implemented on July 20, 1988 prior to discovery of the event. The change was initiated to clarify the overall procedure including which door's interlock was to be defeated.

2) Calvert Cliffs Unit 2 air lock interlocks were verified Operable by review of the most recent STP.

3) At the next available outage which allows opening both containment air lock doors, both door's interlocks will be tested while observing the gears, linkage and interlock pawls. Both the approved method and the method used on June 25 will be used.

4) Surveillance Test Procedure M-171 (Personnel Air Lock Gasket Seal Test) will be modified to also include the testing of both door's interlocks. This STP verifies the operability of each door's seals following the opening of a containment air lock door. Since the STP is performed following the air lock's last use prior to entering MODE 4, positive verification of the interlocks operability will be ensured following each air lock use.

5) A review of this event will be incorporated into the training on the revised HE-21. Specific training will also be given on the containment air lock operating mechanism.

No similar events have occurred previously. The contact for this event is L. S. Larragoite (301) 260-4983.

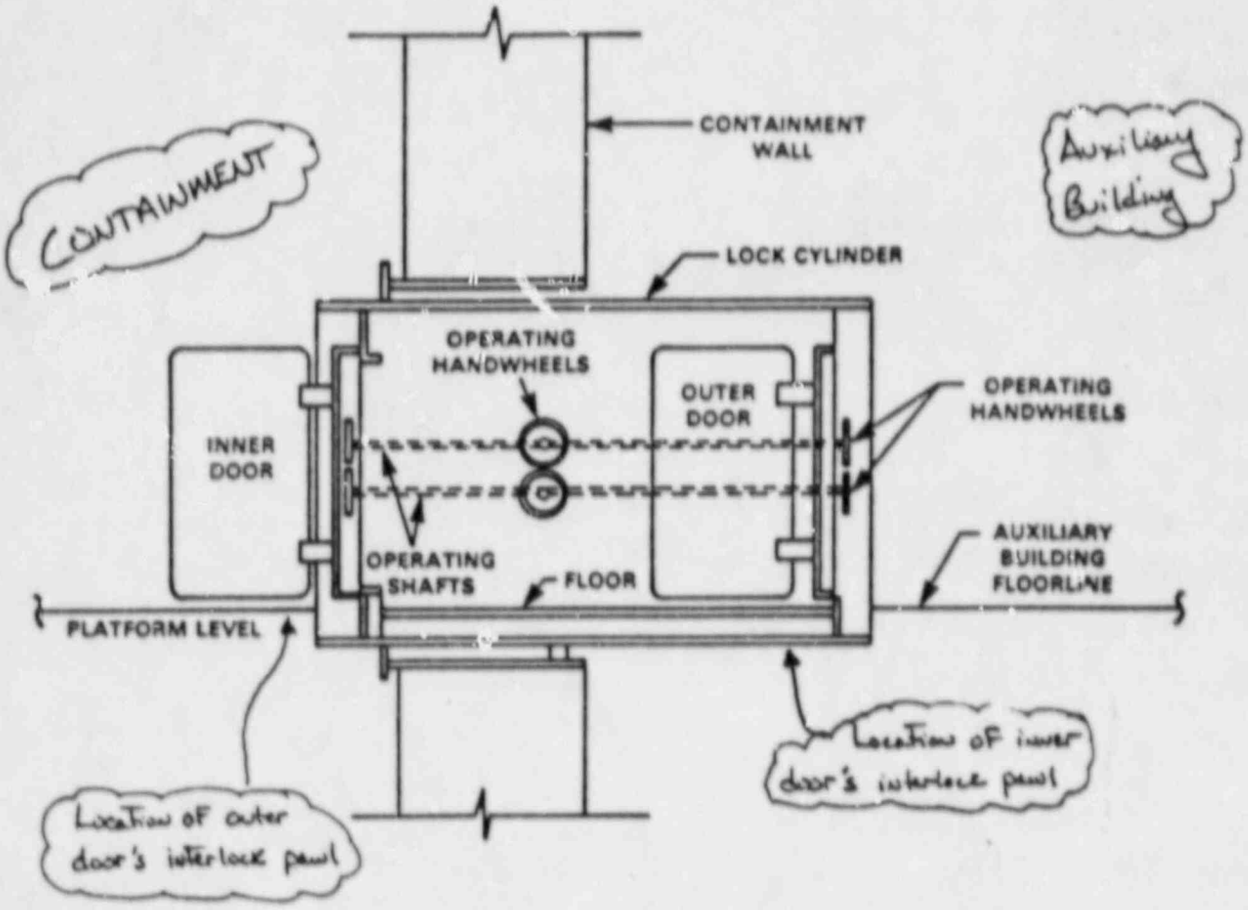

FIGURE 1

PERSONNEL AIR LOCK

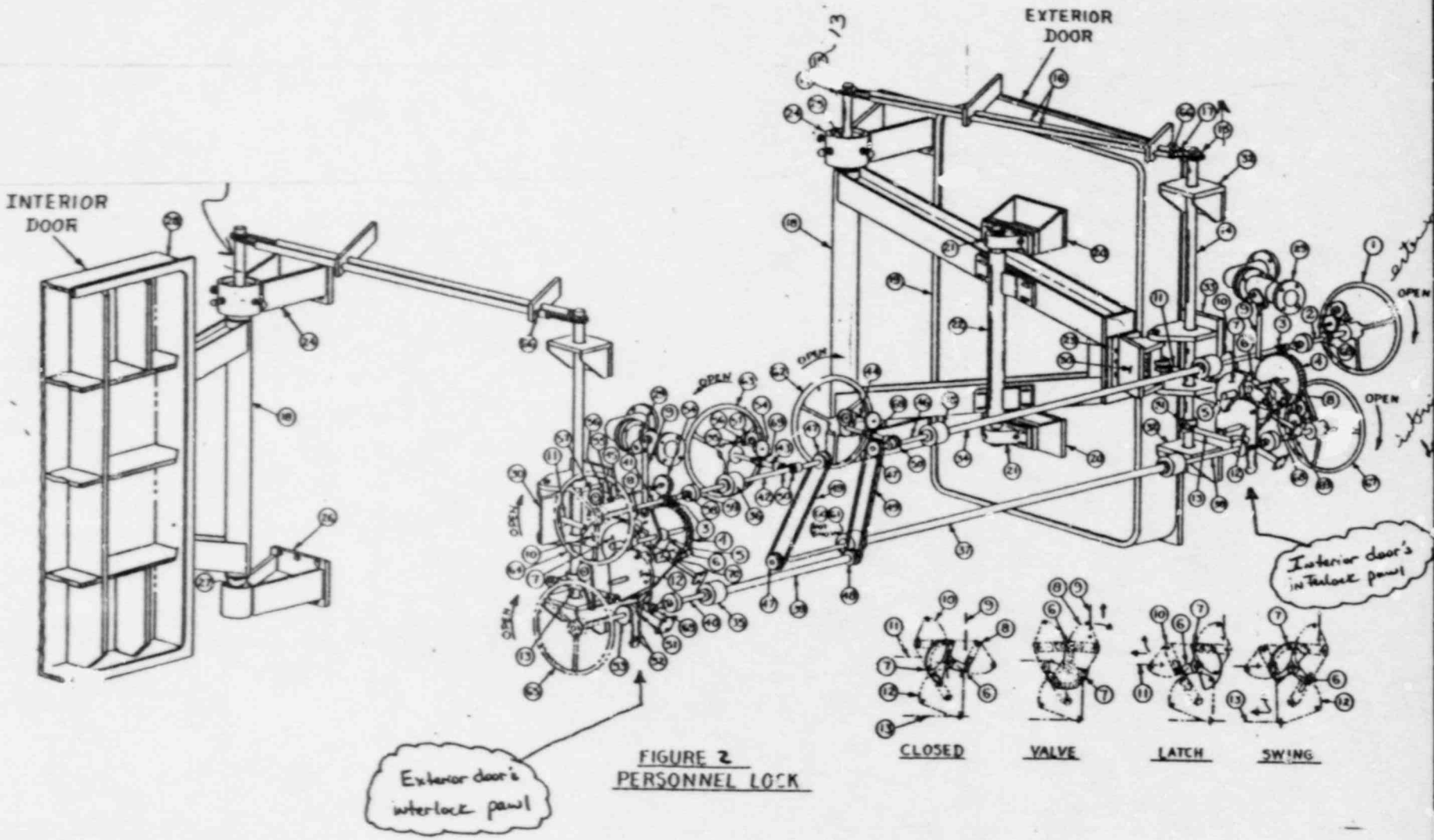

FIGURE 2
PERSONNEL LOCK

BALTIMORE
GAS AND
ELECTRIC

CHARLES CENTER • P.O. BOX 1475 • BALTIMORE, MARYLAND 21203

CALVERT CLIFFS NUCLEAR POWER PLANT DEPARTMENT
CALVERT CLIFFS NUCLEAR POWER PLANT
LUSBY, MARYLAND 20657

September 16, 1988

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Docket No. 50-317
License No. DPR 53

Dear Sirs:

The attached LER 88-10 is being sent to you as required by 10 CFR 50.73.

Should you have any questions regarding this report, we would be pleased to discuss them with you.

Very truly yours,

L. B. Russell
Manager
Calvert Cliffs Nuclear Power Plant Department

LBR:LSL:lmd

cc: William T. Russell
Director, Office of Management Information
and Program Control
Messrs: J. A. Tiernan
C. H. Cruse
L. B. Russell

IE22
1/1